REMARKS

Claims 1 - 8 and 17 are cancelled and new claims 18-28 are added. Claims 9 - 16 have been reinstated per the Decision on the Petition. Claims 9 - 13 have been Amended to correct claim dependency. Claims 9 - 16 and 18 -28 remain in the case.

The present invention basically relates to a method for manufacturing a filter medium for an air filter. Accordingly, the turn of claims is changed. Claims 18 to 22 relate to a method for manufacturing a filter medium for an air filter, claims 23 to 25 relate to a filter medium for an air filter, and claims 26 to 28 relate to an air filter.

Further, in claim 25, each eluted amount of ammonium ion, chlorine ion, and sulfuric acid ion is specified. Claim 22 corresponds to the originally filed claim 7 and the patentability of claim 7 was accepted by the Examiner.

In the new claims 18 and 21, the binder has its chief ingredient a polymer dispersion having a copolymer of a hydrophilic monomer and a hydrophobic monomer dispersed in water. This description was described in original claims 1 and 4.

To manufacture the above noted polymer dispersion, there are two methods. The first one is described in claim 18. That is, the polymer dispersion is obtained by dispersing said copolymer in water after obtaining said copolymer by a polymerization step of bulk polymerization or solution polymerization. The second one is described in claim 21. That is, the polymer dispersion is obtained by a polymerization step of dissolving the hydrophilic monomer in water, adding the hydrophobic monomer to this water solution and dispersing said hydrophobic monomer in said water solution, and adding a polymerization initiator to form said copolymer. Two methods of manufacturing the polymerdispersion are described in line 20 on page 7 to line 4 on page 8 in the specification.

Further the polymerization initiator in claim 18 is described in lines 1 to 10 on page 9 in the specification. The polymerization initiator in claim 21 is described in lines 16 to 21 on page 9 in the specification.

Further, in claims 18 and 21, the use of said air filter is the manufacture environment of a semiconductor device. It is clear in the description of original specification the use of said air filter is the manufacture environment of a semiconductor device.

In new claim 19, the hydrophobic organic peroxide has been diluted by hydrocarbon or a phthalate ester plasticizer of a molecular weight 400 or more. The description about diluting the hydrophobic organic peroxide by hydrocarbon is described in "Binder No. 2" of BEST MODE FOR CARRYING OUT THE INVENTION in the specification. The description about diluting the hydrophobic organic peroxide by a phthalate ester plasticizer of a molecular weight 400 or more is described in lines 11 to 15 on page 9 in the specification.

In new claim 20, volatile organic substances are removed from a mixture including said copolymer and said volatile organic substances obtained by said polymerization step by vacuum suction. One example of this constitution is described in "Binder No. 2" of BEST MODE FOR CARRYING OUT THE INVENTION in the specification.

New claim 22 corresponds to original claim 7 and new matter is not added.

New claims 23 and 24 relate to a filter medium for an air filter manufactured by a method according to claim 18 and 21 respectively and new matter is not added.

In new claim 25, after a sample cut from said filter medium is dipped for one week in a specified amount of ultrapure water, the kinds and amounts of ion that is eluted in the ultrapure water from said sample are analyzed by the ion chromatography, and each eluted amount of ammonium ion, chlorine ion, and sulfuric acid ion from said sample by this canalization is 72μg or less per 1g of said sample.

The analyzing method is described in line 25 on page 25 to line 10 on page 26 in the specification.

The description about "72μg or less per 1g of said sample" is described in the Table 1. That is, in the Table 1, eluted amount of ammonium ion, chlorine ion,

and sulfuric acid ion in the filter medium Nos. 1 to 3 corresponding to embodiment of the present invention is 72μg or less per 1g of the sample, on the other hand, eluted amount of ammonium ion, chlorine ion, and sulfuric acid ion in filter medium Nos. 4 to 6 corresponding to a comparative embodiment of the present invention is more than 72μg per 1g of the sample.

These new claims 26 to 28 correspond to the originally filed claim 8 and new matter is not added.

The feature of the present invention is to specify the polymerization initiator (and diluent) used in the polymerization step when the polymer dispersion is obtained. This polymer dispersion is used as the binder binding fibers during a step of manufacturing the filter medium for an air filter. When the use of the air filter is the manufacture environment of the semiconductor device, it is necessary to make it inorganic substances, such as phosphorus, boron, ammonium ion, chlorine ion, and sulfuric acid, and gaseous organic substances not generated from the air filter.

The ammonium ion, chlorine ion, sulfuric acid ion, and gaseous organic substances are generated from the conventional polymer dispersion used as the binder of the air filter. However, according to the present invention, the polymer dispersion that these substances are not substantially generated can be obtained. Accordingly, the air filter obtained by the method of the present invention is suitable as an object for the manufacture environment of the semiconductor device.

Warbutton Jr. (U.S. Patent No. 4,291,087) discloses a filter medium for an air filter having fibers bound together by a binder to form a non-woven fabric, wherein the binder has its main ingredient a polymer dispersion having a copolymer of a hydrophilic monomer and a hydrophobic monomer dispersed in water. Warbutton Jr. further discloses that the copolymer is polymerized by using APS and t-BHP as a polymerization initiator. However, Warbutton Jr. does not disclose that the use of the air filter is the manufacture environment of the semiconductor device.

Further, the APS and t-BHP in Warbutton Jr. is different from the organic peroxide as the polymerization initiator specified in claims 18 and 21 of the present invention. When the copolymer is polymerized by using APS or t-BHP,

ammonium ion or sulfate ion is generated. Ammonium ion and sulfate ion have a bad influence on the performance of the manufactured semiconductor device.

In the present invention, since the use of the air filter is the manufacture environment of the semiconductor device, the polymerization initiator is limited in order not to have a bad influence on the performance of the manufactured semiconductor device. Warbutton Jr. does not disclose the above noted point.

Distefano (U.S. Patent No. 4,859,527) discloses a filter medium for an air filter having fibers bound together by a binder to form a non-woven fabric, wherein the binder has its main ingredient a polymer dispersion having a copolymer of a hydrophilic monomer and a hydrophobic monomer dispersed in water. Further, Distefano discloses that the copolymer is polymerized by using an organic peroxide as a polymerization initiator.

However, Distefano does not disclose that the use of the air filter is the manufacture environment of the semiconductor device. Further, Distefano does not disclose the organic peroxide as the polymerization initiator specified in claims 18 and 21 of the present invention.

Distler (U.S. Patent No. 3,944,690) discloses a filter medium for an air filter having fibers bound together by a binder to form a non-woven fabric, wherein the binder has its main ingredient a polymer dispersion having a copolymer of a hydrophilic monomer and a hydrophobic monomer dispersed in water. Further, Distler discloses that the copolymer is polymerized by using an organic peroxide as a polymerization initiator. Further, Distler discloses that the hydrophilic monomer is methacrylate and the hydrophobic monomer is styrene.

However, Distler does not disclose that the use of the air filter is the manufacture environment of the semiconductor device. Further, Distler does not disclose the organic peroxide as the polymerization initiator specified in claims 18 and 21 of the present invention.

As described above, all prior arts do not disclose that the use of the air filter is the manufacture environment of the semiconductor device. Further, all prior arts do not disclose the organic peroxide as the polymerization initiator specified in claims 18 and 21 of the present invention.

In the present invention, since the use of the air filter is the manufacture environment of the semiconductor device, the polymerization initiator is limited in order not to have a bad influence on the performance of the manufactured semiconductor device.

All prior arts do not disclose the above noted point. This amendment therefore should place this case in condition for passing to issue. Such action is requested.

Respectfully submitted,

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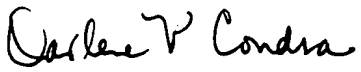

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Dated: June 21, 2002
DPC/jas/dge

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Please amend claims 9-13 as follows:

9. (Amended) A clean room having an air filter according to Claim[8] 26 installed therein.

10. (Amended) A local clean equipment having an air filter according to Claim [8] 26 installed therein.

11. (Twice Amended) A local clean equipment having installed therein a chemical filter for trapping at least one of organic substances and inorganic substances and also having installed therein an air filter for trapping suspended particulate substances in the air, said air filter being installed downstream of said chemical filter, characterized in that; an air filter according to Claim [8] 27 is installed as said air filter.

12. (Amended) A method for manufacturing semiconductors, wherein a silicon water for said semiconductor is processed in at least one of a clean room and a local facility having an air filter as defined in Claim [8] 26.

13. (Amended) A semiconductor device made by processing a silicon wafer in at least one of a clean room and a local facility having an air filter as defined in Claim [8] 26.